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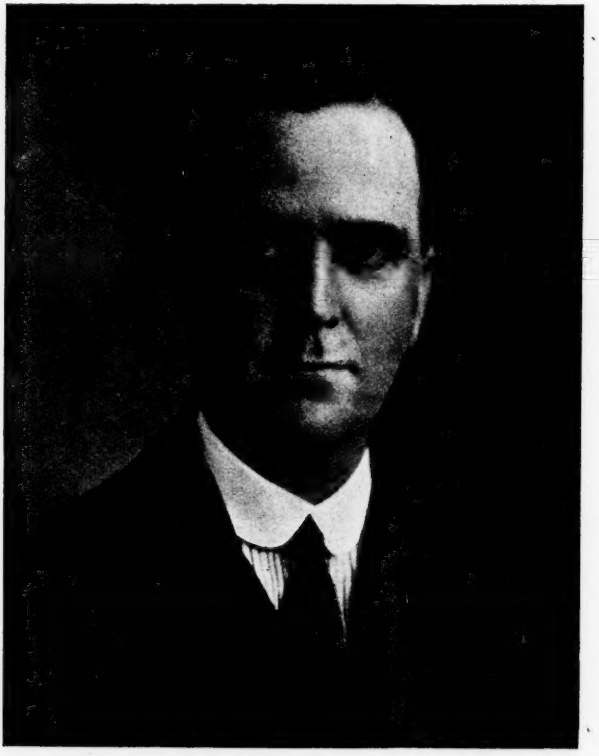

PROFESSOR S. H. GAIGER, F.R.C.V.S.

(Recently elected to the "William Prescott Chair of the Care of Animals—Causation and Prevention of Disease" in the University of Liverpool.)

THE

VETERINARY JOURNAL

DECEMBER, 1925.

Biography

PROFESSOR S. H. GAIGER, F.R.C.V.S.—THE WILLIAM PRESCOTT CHAIR.

THE Senate of the University of Liverpool are to be congratulated on their selection of Professor Gaiger, F.R.C.V.S., for the "William Prescott Chair of the Care of Animals—Causation and Prevention of Disease," and the veterinary profession are well contented that one of their number should occupy this position. It is a position for which the scientific training of the veterinarian of to-day makes him pre-eminently fitted, and it gives another of those opportunities for research in animal diseases for which we have in the past so anxiously desired. It is especially fitting, in regard to this Liverpool University appointment, that Professor Gaiger should have had as his Alma Mater the Liverpool College, and the record which he has made for himself since his graduation has been a brilliant one—one which has been marked throughout its course by perseverance and hard work. Qualifying in 1904, and subsequently taking a post-graduate course in London, he joined the Indian Civil Veterinary Department in 1906, being appointed Professor of Pathology in the Punjab Veterinary College, of which, in 1911, he acted as Principal. During his service in India, too, he did special work at the Imperial Bacteriological Laboratory, Muktesar. It was whilst in India that he had his unfortunate experience as a victim of glanders, from which he has providentially permanently recovered, being probably the only man living who has had this experience. The record of what he went through when suffering from this fell disease, as described by himself in detail in the *Journal of Comparative Pathology and Therapeutics*, will be a monument for all time as an instance of pluck and dominating perseverance against terribly unequal odds. In 1915 Gaiger came to England, qualifying for the Fellowship diploma in the following year, and then travelling to Peru for the purpose of investigating certain sheep diseases in that country. His stay over there, however, was short, and he returned to Great Britain as Professor of Pathology in the Glasgow Veterinary College, of which he was appointed Principal in 1919. In 1922 he was appointed by the Animals' Diseases Research Association as Director of the Research Institute, a position which he has enthusiastically occupied until the present time. In 1919 he was elected a Member of Council of the Royal College of Veterinary

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Surgeons, and this body has recently awarded him the Steel Memorial Medal as an appreciation of his scientific work. The Liverpool Chair is in good hands, and the profession is assured that a career which has been so brilliant in the past will be marked by equally good work in the future.

Editorials

We draw the attention of our readers to the announcement at the top of the cover of this month's issue that the January number of the Journal will be devoted entirely to matters connected with Canine and Feline Medicine and Surgery, and we ask the support of our readers in the shape of contributions of scientific clinical interest, particularly to the practitioner, in order to make it a success. The progress of research into the diseases of the dog and cat has been phenomenal during the past few years, and it is no exaggeration to say that had it not been for this a great many of our town practices would have ceased to exist. It is not, however, only on account of the benefit to these lesser animals alone that the work is important, but it is also on account of their close relationship, as pets in the household, to man himself ; for in many families the dog and the cat occupy places which are sentimentally on an equality with the human members of the household. The dog, by virtue of its intelligence and close companionship with man, has become so much a portion of the family as to take its place almost on an equality with the human members of the household. As a patient the veterinary surgeon has found that its ailments give him as many opportunities for skilful diagnosis and treatment as is given to his human *confrère*. Nowadays, by the proper application of antiseptics and anæsthetics, the most difficult operations may be undertaken with a minimum amount of risk, and the modern veterinary practitioner does not hesitate to open the abdomen or to amputate a limb when necessity demands it. Operations, which only a few years ago were looked upon beforehand with dread, are now done every day, and owners of pet animals have learnt to appreciate the value of modern antiseptic methods almost as much as the members of the veterinary profession themselves.

A number of interesting articles are already in type, and as our space is limited, we appeal to our readers to send us their contributions as early as possible, in order that they may be included in the Special January Number, and thus demonstrate to our colleagues in other countries (for there is scarcely any part of the world where the Veterinary Journal is not sent) that in Great Britain, in this particular subject, we have not been laggards.

THE SPAHLINGER TREATMENT FOR TUBERCULOSIS.

AMONGST the general articles in this month's issue will be found one bearing upon Dr. Spahlinger's treatment for tuberculosis in man and animals. It is clearly and lucidly described and criticised, and we recommend our readers to peruse it carefully. Dr. Spahlinger (whose qualification is that of Doctor of Law and not of medicine) is a very earnest, self-taught bacteriologist, who has promulgated certain theories, after many years of hard study, by which he claims to have discovered a method of curing even advanced cases of tuberculosis. He asserts that his treatment is equally valuable for the animal as well as for man; and, as will be remembered by an announcement in the public and professional Press, a special Bovine Tuberculosis Committee has recently been formed in England to test the value of his remedy on calves. The funds have been provided, the place of testing has been marked down, the animals are ready, and it now remains only for Dr. Spahlinger to allow his promised test to be exploited. His critics will, if severe, be fair in their judgment, and if the results are, as is hoped, successful, there will be no man's name more loudly acclaimed as a benefactor to his country, and indeed to the whole world, than that of our esteemed visitor.

THE LAY PRESS AND FOOT-AND-MOUTH DISEASE.

THAT almost every one of us could name a cure for the unemploy ment and every other evil, and act the part of Prime Minister in much better fashion than Mr. Stanley Baldwin or any other of those who have preceded him, is what one might imagine from the opinions given every day by " the man in the street "—or rather the " man on the tub "—and as with political questions " fools rush in where angels fear to tread," so it is equally true with veterinary problems, foot-and-mouth disease being no exception. Laymen, newspaper writers, agriculturists, stock-owners, and even men holding human medical qualifications who ought to know better, all give advice as to how to treat this dreaded scourge, and our veterinary colleagues on the Ministry are almost daily held up as monsters of ignorance and cruelty. Had they not possessed firm wills and a stern sense of what they honestly considered to be their duty, and been loyally supported by the knowledge that the whole profession was behind them, their courage must have broken down long ago.

With every fresh outbreak a new saviour arises to point out the way of salvation in the shape of prevention and cure. At one time an old Scotch lady of eighty-two came into the horizon and (according to the lay Press) her vaunted cure was little short of a miracle; then

a certain aged doctor who, not finding sufficient scope in his own branch of the profession, must needs turn his brain-waves on to the animal world; and now, in this last and present outbreak, we have one of the foreign members of our own profession—in whose country foot-and-mouth disease is so ever-present that his opportunities to demonstrate his magic are unbounded—boosted by the lay Press.

Why in the name of fortune all these amateur scientists do not go to the Argentine Republic and secure the El Dorado which awaits them in the shape of the huge reward which that country offers to anyone who can "prevent" the ever-present scourge, instead of sowing discontent in the minds of the non-thinking members of the British public, passes all comprehension.

The old proverb that "a man who is his own lawyer has a fool for a client" could be truly and quickly paraphrased if our leaders wavered and permitted lay interference to intervene between them and what their training and their knowledge tells them is the *best* method to adopt. Our colleagues at the Ministry may rest assured that in their present trial the whole profession gives them not only its heart-felt sympathy but its greatest admiration and loyal support.

THE IMPORTATION OF SECRET VETERINARY REMEDIES TO SOUTH AFRICA.

THE new Regulations, which have now become law, in regard to the importation and use of unknown preparations intended for the home doctoring of animals in South Africa has stirred up an angry storm in the minds of those whose pockets have been so well lined by the exploitation and sale of these things in the past.

The law is a just one, and the passing of it is an acknowledgment to our profession that the proper person to treat the ailments of animals is the trained and qualified veterinarian. To allow them to be treated otherwise is to legalise quackery, and it would be well for Great Britain to adopt the same spirit. It is not the *treatment* of the disease which matters so much as the *diagnosis* of it, and many a thousand animals have suffered unnecessarily and been hastened to their deaths by improper remedies unskilfully applied.

According to the *African World*, a recent meeting of the South African Section of the London Chamber of Commerce was held on the 21st of December, and a deputation (of which the spokesman was Mr. L. C. Tipper, M.R.C.V.S.) was sent from the Animal Medicine Makers and Allied Trades Association to protest against the new Regulations introduced by the Union Government of South Africa in regard to the importation of animal medicines.

The particular regulation objected to was that every manufacturer and importer of a stock remedy was required to register with the Department of Agriculture the composition of such remedy.

One can imagine their consternation at having to reveal the ingredients of the mixtures and powders, and thus not only demonstrate in many instances their harmlessness and inefficiency, but also the enormous percentage of profit made.

Treatment without proper skilled diagnosis is quackery. Other European nations have for some time recognised this, and some countries compel the manufacturer of a secret remedy to not only register his mixture officially, but to inscribe the names of the ingredients upon the label of the bottle which the customer buys. The result is undoubtedly beneficial both to the health and pocket of the self-prescriber.

Great Britain is, as usual, behindhand; but perhaps, now that one of her daughters has given her the lead, she too may move in this direction of common sense and equity.

ANIMAL DISEASE PROBLEMS WHICH URGENTLY NEED SOLUTION.

THERE always are, and doubtless there always will be, disease problems to solve—as much in connection with the animal kingdom as that of man—but some of these have more immediate urgency than others.

Glanders and rabies have been eradicated from Great Britain through the aid and application of veterinary research, and benefit is by this means conferred upon man as well as upon the animal world. Anthrax and tuberculosis are now under Government observation, and to be infected with mange, in so far as the horse is concerned, means notification and compulsory treatment. Foot-and-mouth disease of cattle and distemper of the dog and cat, each supposed to belong to the ultra-visible virus group, have up to the present baffled the brains of our best scientists at home and abroad, and cancer is as prevalent amongst our patients as amongst those of the human doctor.

Workers with the diseases of sheep and lambs are hoping to demonstrate preventive methods against several of these devastating ailments during the coming spring, and altogether one can see that veterinary research is moving in an upward direction. The profession lives in hopes, and one hopes that its desires will be realised. It is for those who work in the laboratory and those who work in the field to collaborate unselfishly for this end.

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General Articles

IS SPAHLINGER'S TREATMENT OF ANY VALUE FOR HUMAN AND BOVINE TUBERCULOSIS?

By MAX H. BERG, M.D. (Berlin),
Specialist for Internal Diseases, 47 Berkeley Square, London, W. 1.

New remedies and new methods in the treatment of tuberculosis are usually looked on with scepticism and suspicion by the medical profession. This cannot be wondered at, considering the premature hopes which have too often been aroused under the impression of apparent successes that sooner or later generally ended in disappointment.

Recently the medical and veterinary professions have had under consideration the methods of Henri Spahlinger, the Swiss bacteriologist, who has been working at his theories for about twelve years. Besides the usual general treatment, his methods consist in the application of full sera and partial sera, as well as full vaccines and partial vaccines, the production of which have been kept secret until now. With regard to the experiences of the past, we cannot be surprised that in the meantime the profession is sceptical of this new problem, all the more as hitherto Spahlinger has not scientifically proved the value of his methods.

As far as I can gather from the scanty reports in the literature at my disposal, Spahlinger founded his methods of treatment on the basis of experimental investigation; firstly, on a destruction of tubercular toxines, and, secondly, on therapeutical vaccination. His contention is that tuberculosis can be divided into two classes:—

1. Acute cases where the symptoms can be ascribed to various toxins, which, originating from the tubercle bacilli, occasionally combine with those derived from secondary infection. Cases such as these are suitable for the application of the complex antitoxin.

2. Chronic cases which would respond to active immunisation by extracts of bacilli.

The preparations he has produced can be divided into two groups:—

(*a*) Vaccines, and

(*b*) Antisera.

In the majority of cases of tuberculosis Dr. Spahlinger administers vaccines. Only in rapidly increasing cases, and only in special cases of emergency, does he use sera. His vaccines seem to be, as a whole, similar to other tuberculins which have appeared from time to time and have been used with more or less success. *Spahlinger asserts that he has altered and developed the existing methods for the production of tuberculin and vaccine, and claims to have produced the most effective*

preparations hitherto used. In consequence of the various processes the tubercle bacilli have undergone, he has been able to produce four vaccines. A complete treatment consists of a series of injections of each of these four vaccines.

What is called " full antiserum " is a combination of a larger number of partial antisera, of which each is derived from a horse which has been previously subjected to a special series of injections. The partial antisera are also of different varieties ; one of the groups is prepared by injecting horses with tubercle bacilli or their productions, another group by treatment of horses with other species of bacteria which have been found in cases of mixed infection, combined with tubercle bacilli. The former group is divided into bacteriolytical sera and antitoxic sera, *of which the latter are said to be produced by injection of ectotoxins and endotoxins which have been won from the tubercle bacilli by a specially elaborated method.*

Consequently by the treatment the following results may be attained :—

1. To produce in the patient *active immunity* against the tubercle bacillus and its toxins by the injection of vaccine.

2. To give the patient *passive immunity* by the aid of antiserum which is supposed to possess antitoxic and bacteriolytical properties.

This procedure apparently contains nothing fundamentally new, but it consists in the main of the same axioms which in other infectious diseases have been used with more or less success, and which have guided in their work all investigators since Pasteur and von Behring. *The only new points are stated to concern the technical details and the exact methods of producing the vaccines and the different substances which are required for the inoculation of horses : and these Spahlinger has, up to the present, preferred to keep secret, so that it is not possible to investigate his claims.*

If he has used any experiments with a series of vaccine injections for the purpose of obtaining active immunity, then no fixed data have been published which could conclusively prove that animals, which have been inoculated with these vaccines, have developed immunity against the tubercle bacillus. As regards the effect on human beings the clinical proof is still wanting. Still, a satisfactory proof could only be brought about by the help of much material which can be treated and observed under strictly experimental conditions. Consequently it is impossible at the moment to form an opinion in this direction.

Of particular interest is Spahlinger's assertion that his serum mixture (which he calls " full serum ") contains antitoxic and bacteriolytical components, and that his antitoxic sera are derived through

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previous treatment of horses which have been inoculated with "ektotoxins." So far no one has been successful in obtaining a true ektotoxin from tubercle bacilli, similar to those toxins free of bacteria which have been obtained from diptheria bacilli or tetanus bacilli, which in inoculated animals have shown the characteristic symptoms of the corresponding disease. Spahlinger, in common with other scientists, has up till now not satisfactorily proved that his sera contain actual antitoxins. He designates these sera "antitoxic" because he obtains them from horses previously treated with substances which he calls "toxins." *But, up till now, nothing is known that he has given any proof that he has succeeded in obtaining an actual extracellular toxin from tubercle bacilli.* His claim that his serum contains antitoxic properties seems only founded on the observation that rapidly progressing cases of *tuberculosis caseosa* have been arrested by the use of the serum. On the other hand, it is well known that patients with acute tuberculosis have survived the acute stage and have reached a chronic stage, which enables them, more or less, to once more resume their normal occupation. This is amply shown in cases of phthisis with large dry caverns, which can be occasionally observed in every out-patients' department.

Among his special colleagues who have visited Spahlinger in his Bacteriological Therapeutical Institute in Geneva several have considered him to be a serious and enthusiastic scientist whose work deserves recognition, and several clinicians and specialists at whose disposal he placed his various sera and vaccines have made hopeful reports. The *British Medical Journal*, in the course of the last year, has several times brought reports regarding the "Spahlinger treatment" to which I principally here refer, but most of them have been very reserved. In the main the medical profession remains quiescent and regards these methods with a certain amount of distrust, which is not without justification, for the daily papers from time to time bring information concerning wonderful successes which are supposed to have been obtained through "Spahlinger's Infallible Remedy," which consequently has raised the public hope to a very great pitch. But Spahlinger is far from asserting to the medical profession in the medical press that he has achieved any scientific proof that his remedies and treatment are something new, or that he has contributed anything more effective than has hitherto been known in the scientific world.

Then there is the problem of bovine tuberculosis, undoubtedly a problem of immense importance, since we know that milk from tubercular cows is a potential source of human infection, and causes many thousands of deaths in this country alone every year. Has Spahlinger indeed given us the means whereby we may prevent

bovine tuberculosis? Lately it has been reported in the Parliamentary Press that Spahlinger immunised the cattle on his estate of Carouge, near Geneva, nine years ago, so that ever since, he states, they have been perfectly immune, and did not react to the largest doses of tubercle bacilli. I am not aware that the evidence of a genuine immunisation has been checked by any scientifically authorised body. Over and over again it has been suggested by the Press that steps for public and controlled tests should be undertaken without delay, and one wonders why Dr. Spahlinger hesitates to accept the opportunities which have been offered to him.

The publications which have appeared in England and France have from the beginning been followed with interest by the Ministry of Health, and all available material and clinical records have been carefully examined. In the year 1922, in agreement with Spahlinger, a medical representative of the Ministry was commissioned to visit the Spahlinger Institute in Geneva, and to examine certain cases of tuberculosis that had been treated there. These cases were not only patients suffering from phthisis, but also those suffering from lupus, tuberculosis of the glands, as well as tuberculosis of the bones and joints. As could be gathered from the records in the cases of phthisis, tubercle bacilli had been found in the sputum, and some of the patients had been in advanced stages of the disease before the beginning of the treatment, their condition being described as hopeless. In a number of cases X-ray records were preserved, which demonstrated the condition before and after the Spahlinger preparations were used. The complete, or partial, arrest of active and extended disease, which in these cases was noticed shortly after the application of the Spahlinger preparations, and lasted for several years, seemed to speak for the efficacy of the treatment. Nevertheless it is a fact that a certain percentage of the patients improve under all conditions and are practically cured. The Ministry in consequence came to the following conclusion: "That although it was not possible as yet to judge of the scientific value of the Spahlinger methods from the bacteriological point of view, for the reason that the technical details employed for the preparation of serums and vaccines had not been published, yet, on the other hand, the clinical results which have been achieved in Switzerland and England were worthy of further investigation." Spahlinger was informed that the Ministry, with his consent, would be prepared to send a Commission of acknowledged medical experts who would report on the results and the value of his treatment in a number of cases which were to be selected by a medical man specified by him. The technical details of the reproduction of his preparations he was not to be asked to divulge.

Unfortunately Spahlinger did not avail himself of this most generous proposal. The reason for this refusal may be found principally in his statement of the exhaustion of his own finances and in the fact that he was not in a position to prepare serum in sufficient quantities for such experimental proofs as were proposed by the Ministry of Health. Still less was he said to be able to produce sufficient quantities for general use. His supply of full serum and full vaccines was alleged to be furnished in 1914, and since then he has only prepared partial serum in small quantities. The preparation of his full serum and his full vaccine is said to be a long, complicated, and costly process, and Spahlinger at that time did not appear to be able to give any date at which he would be in a position to produce larger quantities of his preparations for investigation on a bigger scale and for the general use.

All the same, the offer of the British Ministry of Health is still open, and last year Mr. Neville Chamberlain, in Parliament, expressed his readiness to have a thorough investigation carried out by a competent body of medical authorities if the preparation could be supplied in sufficient quantities. In order to assist Spahlinger in his financial difficulties the British Red Cross Society came forward with offers of assistance for the benefit of disabled men, and the English Government, I am given to understand, not long ago granted £500 towards this object. It appears that influential circles intend to organise an appeal to the public to assist Spahlinger's work financially; perhaps this accounts for the frequent Press notices which have appeared in this connection. The usual generosity of the wealthy classes in England for charitable and scientific purposes leaves no doubt that such an appeal would be crowned with success, and also that some of the Dominions, amongst others Canada and Australia, would contribute largely, provided satisfactory arrangements had been arrived at.

Five medical Members of Parliament are said to have visited Carouge this summer, and only lately, under the leadership of Sir Alfred Mond, a public appeal has been put forward with the object of investigating Spahlinger's methods to the fullest extent. For this purpose there has been a proposal to buy the Spahlinger Institute (which will cost at least £30,000) at Carouge, near Geneva, and it is to be seen whether this sum will be subscribed for. With regard to *bovine tuberculosis*, a special Committee of medical and veterinary men has recently been constituted in Cheshire in order to test Spahlinger's remedies on cattle, and I understand that any number of cattle in this country can be had for the examination and test of his methods. No report has, however, as yet been issued to the Press.

Consequently there is sufficient reason to induce Dr. Spahlinger (and thereby impose a moral obligation on his part) to place at the disposal of a competent scientific tribunal the necessary quantities of his preparations for examination, and that without further delay in order to enable them to judge of its value. This would not only be in his own interest, but also for the benefit of the general public. Hitherto the basis for critical opinion has been confined to clinical observations which have given favourable and hopeful results of the Spahlinger treatment; but it has not yet been proved that these methods are more effective than those hitherto used. It is, therefore, fervently to be hoped that Dr. Spahlinger will no longer hesitate to provide the medical and veterinary profession with substantial evidence of his laboratory work.

The opportunity is in his grasp, and, for the sake of suffering humanity, to say nothing of the economic loss to the agriculturist, it seems almost criminal that this lawyer bacteriologist will not prove (if he can) the hope of cure which he has permitted to be raised in those who are dying daily from the Great White Scourge.

The veterinary branch of medicine, equally with the human, are ready to acclaim this scientist as a saviour of their patients—if only proof can be given that the assertions, which have been so widely accepted and boomed in large headlines by the lay Press, can be proved to be true, or even if they only have foundation in fact.

VOLTAIRE AND BOURGELAT.

In a paper on "Voltaire and Medicine" read before the Section of the History of Medicine of the Royal Society of Medicine on October 21st, the President, Dr. J. D. Rolleston, M.D., illustrated Voltaire's interest in veterinary science by his correspondence with Bourgelat, to whom on one occasion (October 7, 1771) he sent the bladder of one of his oxen in which he had found numerous stones. In a subsequent letter to Bourgelat, dated March 18, 1775, he wrote: "I am surprised to find that before your time cattle were the concern of butchers only, and that horses had only a blacksmith as their Hippocrates. Real help is wanting in the best administered countries. You have put an end to this disgraceful and dangerous state of affairs. . . . I should like a search to be made for remedies for the contagious diseases of our animals when they are in good health for use when they are ill. A dozen different remedies could then be tried on a hundred oxen attacked, and one might reasonably hope that some of the remedies would succeed. There is at the present time a contagious disease in Savoy about a league from me. . . . My method of protection is to have no communication with the plague-stricken, to keep my

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animals scrupulously clean in well-ventilated stables, and to give them wholesome food." Voltaire's precautions against epizootics in his district are also illustrated in a letter recently brought to light by Vézinet (*Autour de Voltaire*, 1925, p. 34) in which he says: "The preservation of cattle being of the greatest importance in our unhappy country, I sent a message to Fretter, one of the butchers in Ferney, that if he did not bring a certificate for the three oxen he bought about a fortnight ago I would expel him from Ferney. I had the same message sent to Abraham Meunier, who appears to be a very doubtful and dangerous character, capable of infecting the whole country in order to gain ten sous."

A VETERINARY SURVEY OF THE BUKOBA DISTRICT, TANGANYIKA TERRITORY.

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Introduction.

The district of Bukoba is situated on the western shore of Victoria Nyanza. The first degree south latitude forms the northern boundary and separates it from Uganda. On the west it is bounded by the Kagera river, on the other side of which lies Belgian Ruanda.

The sub-district of Biharamulo lies to the south of Bukoba proper, and this sub-district in turn is separated from the districts of (east to west) Mwanza, Kahama, Kibondo, and Belgian Urundi by very ill-defined boundaries.

In preparing this veterinary survey of Bukoba district a considerable amount of evidence has been derived from native sources, especially as to the historical part, and hence it can only be accepted with reserve, but I have tried by a tedious process of examination and cross-examination to sift the wheat from the chaff. I dare not think, however, that the history related is without fallacy.

For example, one of the difficulties which arose was the fact that the disease known as contagious pleuro-pneumonia of bovines was first known as "sotoka" or "nsotoka," and later the same name was applied to rinderpest. Possibly this may have been due to Swahili and Arabic influences—peoples who in spite of their superior intelligence in other directions knew comparatively little of cattle and their diseases.

Again, it will be obvious that dates—certainly prior to 1899—are a matter of conjecture. The native, having no knowledge of calendars, usually states that he was such and such a height when a

certain disease occurred—hence one is left to guess his present age followed by a guess at the age as indicated by his height.

If any of my readers can give me any further information or help me in any way to correct errors, either of omission or commission, I would be grateful if they would communicate with me.

This veterinary survey is merely a preliminary effort to get our present knowledge on the subject put on a systematic basis in order that it may be of assistance in future inquiries. It has been my experience that in areas which are devoid of cattle a distinct sense of depression is manifest amongst the natives and even a tendency towards retrogression. I also suspect a relatively high human mortality in these areas, and at any rate it will suffice to state that the conservation and improvement of the livestock of the country is without doubt absolutely essential to the well-being of the inhabitants.

History.

It would appear that prior to the year 1855 the district was in a more or less flourishing condition as far as livestock was concerned, although it is probable that a certain amount of East Coast fever was present. Even the oldest inhabitants say they can remember their fathers stating that this disease has always been with them. The explorer Speke mentions the " thousands and thousands " of head of cattle in Karagwe in the year 1862. I should think that at a moderate estimate the number of cattle in the whole district (including the sub-district of Biharamulo) was about 400,000 in that year (1862). All the native evidence is unanimous that in the days of their grandfathers this was a country overflowing with milk, if not honey.

From this time onwards the trouble seems to have commenced. As far as can be ascertained, there were six severe outbreaks of cattle disease since the year 1850. Three were of the same kind, and known as shuna, and the others as uruakipumpuru, sotoka (pleuro-pneumonia) and mobiamo (rinderpest). These diseases seemed to have occurred in the following sequence and approximately on the dates stated, i.e.: (*a*) shuna, 1855; (*b*) shuna, 1867; (*c*) uruaki-pumpuru, 1870; (*d*) shuna, 1876; (*e*) sotoka (pleuro), 1880–1884; (*f*) mobiamo (rinderpest), 1889–1890.

It is highly probable that prior to the year 1850 the cattle herds were visited with outbreaks of contagious disease from time to time, but I am unable to gather any authoritative evidence on the point.

Taken as a whole, the diseases named increased in virulency as time went on, and culminated in the terrible visitation of rinderpest

in 1889, which almost denuded the district of its cattle, and in consequence there was no outbreak of other serious disease during the remaining part of the nineteenth century.

It is also worthy of note that all these epidemics came from the north, i.e., Bunyoro and Ankole (Uganda), whereas the latter day infections come from the south (Mwanza and Kahama districts).

In order that the profound influence which animal disease has had on native life and customs may be the more fully appreciated, it will be within the scope of this survey to mention a few of the main characteristics of the peoples who inhabited this district prior to 1889.

There were and are really three chief tribes, i.e., the Wahinda, the Wahima, and the Wairu. The Wahinda were the real ruling class —of the blood royal from which the Sultans were drawn. At the present day there are only four of the eight Sultans who can legitimately be called pure Wahinda.

The Wahima—also known as Watwali—were the under chiefs in charge of Gombolola areas. It was these who led the people to war and who acted in an advisory capacity to the Sultans. The Wahinda themselves rarely took any active personal part in tribal hostilities.

Nowadays the Wairu are frequently admitted as Gombolola chiefs.

The Wahima were the cattle-owning aristocracy of Nilotic origin, whose staple foods consisted purely of animal products such as milk, meat, and blood. The Wairu were the poor lower class who acted as the herdsmen and menials of the ruling Wahima, and their chief diet was of bananas (vitoke). The Wahima regarded the Wairu simply as their slaves, and held them in contempt. These two tribes probably held the same relative position as do the Watusi and the Wahutu of Ruanda to-day. It will be seen later how this old order of things has been changed by cattle disease.

Diseases of Long Standing.

Since time immemorial two diseases have been present in the district, i.e., East Coast fever (masheuyu) and trypanosomiasis (murasho), but they were not present to the same extent that they are to-day and did not cause any serious anxiety—in fact, they were regarded as a necessary evil. East Coast fever—affecting calves chiefly—was thought to be carried in the milk of the mother and passed on to her offspring when they suckled the milk. All the people knew the disease and recognised it by the enlargement of the lymphatic glands (parotid) immediately below the ear. The mortality was fairly considerable, and in order to combat it the owners cauterised the affected glands with a hot iron, and in addition they

often gave a potion made as follows: The stems of the following shrubs were ground down together: mwoko, moi, rurokomya, and bwungu wa bwamoi. This mixture was tied up in a banana leaf and boiled in milk, cooled, and poured down the nostrils of the patient.

Trypanosomiasis was not uncommon, and was believed to be due to eating the grass in forest land (pori). It was associated in some vague way with wild animals, but apparently the tse-tse fly was never suspected. In those days the "fly" belts were very much smaller and not anything like as widespread as they are nowadays. There are old men living who can remember the time when the whole Muisa valley was cattle country, and also the area between Kyamuraile and Bugene, and also between Biharamulo and Keza. In fact, there were very few parts of this district which did not carry cattle (the area between Bwamira and Burigi was mentioned as being fly-infested), and in consequence trypanosomiasis was a comparatively rare disease. There was no "dawa" * for murasho cases, and they were simply left to pine away.

Diseases known as Shuna and Uruakipumpuru.

I do not know exactly what English nomenclature should be applied to these two diseases, but I strongly suspect that the disease called Uruakipumpuru is malignant catarrhal fever, and the following extract from Hutyra and Marek's *Special Pathology of the Domestic Animals*, second English edition, vol. i. p. 438, is interesting: "Lichtenheld reports on a malignant catarrh of cattle in German East Africa, which with otherwise similar symptoms is differentiated from the catarrhal fever occurring in Europe by its epizootic form, with losses up to 75 per cent.; further by its marked predominance of the affection of the intestines and the usually hæmorrhagic character of the mucous membranes."

According to the natives, uruakipumpuru begins with lesions on the tail and a sanguinous discharge from the nose, followed by a violent and evil-smelling diarrhœa, and death within two to three days. On post-mortem the muscles were found to be in an advanced stage of decomposition, and could not be eaten by the natives. There has been only one outbreak of this disease in Bukoba, and it caused a very high mortality. There was no "dawa" for the complaint, but quarantine was imposed and separate drinking-places were allocated to the infected herds.

The following symptoms are described in regard to shuna: The disease begins with ulcers in the mouth, affecting the mucous membrane of the tongue and cheeks and the lips. The tongue becomes

* Dawa means medicine.

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very much swollen and there is a nasal discharge. The teeth fall out, the horns and pedal extremities slough off. The milk assumes the consistency of mucilage. Death follows soon afterwards. The disease is not considered anything like so contagious as sotoka (pleuro). The only action taken to combat this infection was segregation of infected herds and quarantine restrictions.

Treatment was sometimes undertaken by the more intelligent and energetic owners. This treatment consisted of two medicines, the one for external application and the other for internal. The former was composed of red native potatoes boiled and cooled and then smeared over the affected parts, i.e., the mouth, tongue, and feet. The latter was of much more intricate preparation : The ingesta of an all-black goat was taken and mixed with leaves of the following shrubs : ruchui, rusinga, ndereme, and mwanga, and the whole boiled. The resulting mixture was stirred into the river or watering hole so that the animals drank it. It is stated that the use of these two medicines in conjunction was very effective.

As I have already pointed out, there were three outbreaks of shuna and one of uruakipumpuru, the dates of the former being about 1855, 1867, 1876 respectively, and of the latter 1870, and they caused a fairly high mortality. These were followed (1880–1884) by an epidemic of pleuro-pneumonia (sotoka).

Pleuro-Pneumonia.

This disease came from Uganda, but does not seem to have caused any great anxiety amongst the cattle-owning people of the district, due no doubt to the insidiousness of its onset. When it was observed in a herd the owner at once moved off into another clean area. It affected only the mature or aged stock, the calves escaping. The death-roll from this cause does not seem to have been very great, and no medicines were used to combat it. The owners simply ran away from it.

It is noteworthy that pleuro-pneumonia does not exist in the district at the present time, and this may be explained by the fact that rinderpest swept the country a few years later and killed off all infected animals.

This disease (pleuro) was followed by the notorious outbreak of rinderpest in 1889–1890.

Rinderpest.

This infection, known locally as mobiamo, was the most terrible scourge which has ever been visited upon the domestic animals in any country. It swept the entire district from north to south, com-

pletely annihilating the cattle herds and leaving nothing but death in its train, all within the years 1889–1890. It is reckoned that approximately 95 per cent. of the cattle in the district died of this disease in these two years. It was this same epidemic which, beginning in the north-eastern territories of Africa (Sudan, Abyssinia, etc.), spread southwards down the Nile, through Central Africa and Rhodesia, and eventually reached the Cape in 1897, where its devastations ruined the livestock industry.

In Bukoba district a great many of the Wahinda and Wahima cattle-owners emigrated southwards into Mwanza and Tabora districts with their herds in a vain attempt to escape from this plague, and I believe these people are to be found to-day in these districts. It is also stated that some owners found their way into Ruanda. The Wahinda and the Wahima now found themselves deprived of their staple food, and in consequence they were forced to change their habits and take to the food of the Wairu (vitoke). Large numbers of the people died at this period, due, no doubt, to either refusing to eat this "shenzi" * food (starvation), or as a result of such a sudden change of diet. This human death-roll might also be attributed to eating the infected meat or most probably to a concatenation of all three causes. Many committed suicide because, having lost their all, life was without hope. It is stated that all kinds of game were wiped out with the exception of elephants. Buffalo especially suffered. It will be realised that the class distinctions obtaining heretofore were shattered at a blow by this great leveller. The poor became comparatively rich and the rich poor. Although to-day these three clans still retain a certain amount of their tribal characteristics (including the inevitable snobbishness), nevertheless the old social barriers have been more or less completely demolished. Inter-marriage is now quite common, and the staple food for all three classes is vitoke, potatoes, etc. No longer are the Wairu regarded with contempt.

Certain it is that during the lean years which followed this outbreak there existed a spirit of the most intense depression throughout the land.

In Karagwe, where the tribal distinctions are more marked than in Bukoba itself, the ravages of this disease are particularly apparent, especially when it is remembered that in those days that Sultanate (under Rumanyika) was a much more important place than Bukoba. Now the position is reversed.

As a result of this denudation of the country of its cattle, huge areas of pasturage rapidly reverted to bush and became the home of

* Shenzi means vulgar, common.

tse-tse fly and game. Such is the origin of most of the "fly" belts in the district at present.

As has been stated already, rinderpest did some good in so far as it ridded the district of pleuro-pneumonia, a disease which is possibly more difficult to control than rinderpest. After this epidemic had subsided, the Sultans commandeered the remaining few cattle, and, having satisfied their own wants in regard to the milk supply, they placed the remainder at the disposal of the sick, the pregnant women and the children. It is probable that this is the origin of the local custom to regard all cattle as the property of the Sultan, who in turn loaned them out to his favourite subjects on the condition that they could have the milk and manure for their garden, but any offspring became the property of the Sultan.

The custom soon sprang up of herding all the cattle together in each Gombolola. This was probably necessitated by the scarcity of bulls in the first place, and secondly because fewer herdsmen were required, which liberated the remainder for other work.

There is no doubt that it is due to the circumstances which obtained after the rinderpest visitation that the present system of dual ownership of cattle has come about. In fact, in many instances one beast may be the property of five or six owners, or even more, so valuable is the milk and manure. That this disease exercised a profound influence on the general health of the community goes without saying. They were deprived of their milk supply, and in consequence the children suffered and the stamina of the people was seriously affected, as is obvious to this day.

The foregoing are, I think, the chief points in the exceedingly sad veterinary history of Bukoba district up to the beginning of the present century.

Apart from the major diseases with which we have dealt, there are others which have existed in the past and which do exist at present, and beyond doubt they cause a heavy annual mortality not only amongst the cattle, but also in sheep and goats. Such as: kishanda, bite, kaboi, kiaga, kashato (to be described later), and also verminous infections of both roundworms and tapeworms, etc.

A disease known locally as buganga (in Luganda it is called kiganga) also exists. It affects the tail and is thought to begin with tick bites on its lower extremity, from where it spreads upwards to the root of the tail, causing it to slough, and eventually, after one to four months, death ensues. It appears to affect bones of tail chiefly. There is no pus formation. The owners of such cases often cut off the affected portion of the tail and cauterise the stump with a hot iron to prevent the spread of the disease. Sometimes this treatment

is successful. The natives regard this disease as contagious, and segregate affected beasts.

The above disease would appear to be little known, but it has been reported recently at Missenyi (June 1924), where five deaths have been attributed to it. This is distinct from uruakipumpuru.

There is also a skin affection called kanyamutinda, which affects only the backs of cattle with pus formation and does not cause death. This, however, may be streptothricosis.

Kajuromba is another infection recently reported at Kaguruka, and I think it corresponds to Murasho (trypanosomiasis), but perhaps it may be a more virulent infection, due to a different type of trypanosomiasis (vivax or congolense).

Kishanda is a disease affecting the limbs, resulting in lameness for two to three days, during which the patient is off its food and is kept indoors. Recovery is the rule, but bleeding from the jugular vein was practised.

Bite was not common, but when it was contracted death usually resulted within twenty-four to forty-eight hours. This may be anthrax. About kaboi and kiaga I can gather no reliable information, save that they are two distinct and well-known diseases to the natives, and are popularly supposed to be due to eating bad or poisonous grasses.

Kashato corresponds to ringworm.

Verminous infections (worms) affect all stock, but in particular calves, goats, and above all sheep. In fact, with the exceptions of the Sultanates of Karagwe and Ihangiro, it is next to impossible to breed sheep in Bukoba, due mostly to this cause and the heavy tick infestation, and those which do exist are of the poorest possible quality.

In addition to the above there are other diseases, amongst which might be mentioned: contagious abortion (called kutoroga), mange and streptothricosis (upele) and diseases of the udder. This last is commonly observed.

Colon bacillosis is also prevalent in calves, causing high mortality.

Since the year 1900 up to the present (July 1924) the district and sub-district (Biharamulo) has been visited repeatedly by rinderpest, which has taken heavy toll of the remaining herds. Particularly during and after the war, and in fact at one time (1919) it seemed as if this disease was to become enzootic, due mainly to the lack of veterinary personnel to control it and to the unsettled state of the country at that time, but latterly the strenuous efforts of the veterinary department have been successful in eradicating this scourge and the district has been "clean" since September 1923.

This has been rendered possible only by the strict control of stock movements throughout the district and the creation of an enlightened public (native) opinion. We can only express a pious hope that this state of affairs will continue in the future.

The Present Situation.

The district of Bukoba proper is divided into eight Sultanates, and the sub-district of Biharamulo into five, as follows :—

Bukoba : (1) Missenyi ; (2) Kiziba ; (3) Bugabo ; (4) Kiamtwara ; (5) Kanyangereko ; (6) Kianja ; (7) Ihangiro ; (8) Karagwe.

Biharamulo : (1) Rusubi ; (2) Busubi ; (3) Usambiro ; (4) Kimwani ; (5) Bugufi.

I shall discuss the sub-district of Biharamulo first. More than two-thirds of this area is uninhabited bush, which is infested with tse-tse fly for the most part. The natives of the sub-district are extremely backward, and with few exceptions the populated areas seem to be in a perpetual state of semi-starvation. These areas are generally separated by huge belts of bush and tse-tse fly, and the inhabitants live a hand-to-mouth existence, and consequently it will be realised that to feed a safari * is often difficult and sometimes impossible.

Porters from the banana-eating type, as in Bukoba, are forced to eat muhogo,† matama,‡ and potatoes, which gives them diarrhœa and colitis. The district, like Bukoba, used to be flourishing with thousands of cattle, but pleuro and rinderpest wiped them off almost completely, As a result the natives emigrated or died, and bush and tse-tse have taken their country, with a paralysing result. One can see on every hand young bush springing up and derelict gardens.

There are no crops of commercial value in the district, as far as I can see. Very little ground-nuts are grown in certain parts, and in Usambiro a mild trade is done in hoes, which are brought into Kahama and exchanged for cattle (ten hoes for one bull). With the exception of the Sultanates of Busubi and Bugufi, I can see little hope of progress in animal husbandry in any part on account of tse-tse fly. There is little enough pasture for the stock already there, and the fly is gradually encroaching and strangling even these small areas. The awful hold which this pest has got, surrounding every cattle area as it does so, makes ingress and egress impossible without the risk of trypanosomiasis—a very great risk at that. This means that trypanosomiasis is carried into the cattle areas and is propagated by biting flies other than Glossina. Thus it will be

* Safari means caravan. † A root, cassana. ‡ Millet.

obvious that unless some steps are taken to combat this constant and ever-increasing menace, the livestock of Biharamulo are doomed; and if rinderpest or other infectious diseases are introduced, the task of the tse-tse will be enormously facilitated, if not entirely completed, in the not very distant future.

Biharamulo, in the days before European occupation, was a buffer State between the Wasukuma on the south and the Wanyambo of Karagwe on the north, and in consequence it was frequently ravaged and laid waste by one side or the other; also the country in those days was very badly administered by the ruling chiefs.

The country may be divided into three main cattle areas, i.e.: (*a*) A strip up the lake shore (Bwina area), (*b*) a central area around Biharamulo township, and (*c*) the western area, including Busubi and Bugufi. There are also a few head around the southern end of Lake Burigi.

The above three areas have each a distinct type of cattle, the lake-shore area having the small, short-horned, compact, humped Usukuma type, the western area has the long-horned, straight-backed Ankole or Ruanda type, and the central area has a type which seems to combine some of the characteristics of both the foregoing (an intermediate type). The Ankole type, especially in Busubi, is a very fine big beast, but I doubt if it gives a greater quantity of milk than does the Usukuma, and my experience is that the meat of the Ankole is more often and more heavily infected with measles than the Usukuma kind.

In pre-war days I believe a huge trade was done in trekking livestock from Urundi to Bukoba through the village of Nyamisina, in Usambiro, which was then a flourishing township. This trade also included other agricultural products such as hides, honey, ghee matama, etc., but nowadays this trade has ceased and the village is practically derelict. In more recent years a very large trade in cattle, etc., was done by petty traders from Usukuma through Biharamulo to Bukoba (mostly for slaughter purposes), but it has been found by experience that this resulted in the introduction of rinderpest, and in consequence the whole sub-district of Biharamulo has been closed to the importation of cattle. The veterinary department has chiefly, through its native personnel, succeeded in making this closure more or less effective, but it will be realised that over such a large area and dealing with such a people the difficulties are immense.

Since September 1923 up to the time of writing (August 1924), there has not been an outbreak of rinderpest, and we can only hope that this satisfactory state of affairs will continue in the future.

East Coast fever is undoubtedly present in Biharamulo, but not to the same extent as in Bukoba.

BUKOBA PROPER.

The native of this part is comparatively rich financially. His coffee brings him in sufficient money to pay his tax (9s.) and also to get any other necessities and luxuries which he may require. It is essentially a lazy man's crop, requiring little or no care from year to year. His food is bananas, which again need little attention. The banana-tree provides the shade for the young coffee plant and its leaves give the manure. Unfortunately this banana-tree takes two years to reach maturity, and then only gives sufficient food for about two days when it is finished. These two easily cultivated crops provide the owner with most of what he wants, and any cultivation which must be done is generally left to the womenfolk, with the result that the male inhabitants are left more or less to their own devices, amongst which pombe *-drinking figures far too prominently. Nature has been exceptionally good to these people, giving them a bountiful rainfall, well-watered, good land, and an equable climate, which, as usually happens under such circumstances, has encouraged idleness. The stamina of the people has become seriously undermined. Venereal disease is rampant, particularly syphilis. The milk supply is hopelessly inadequate to supply their needs, and the very young children especially suffer as a result. It is interesting to compare the working capacity of these people with that of the Wasukuma of Mwanza district, where the supply of milk is plentiful. It is reckoned that these latter can do 50 per cent. more work, and do it more efficiently. Owing to the greater remuneration derived from the cultivation of coffee, red pepper, and very recently cotton, the livestock industry has had to take a back seat. This, to my mind, is a very serious position, and it is having a most detrimental effect on the native, to whom the essentials of life are meat, milk, and butter.

The present paucity of cattle, etc., is due to (*a*) the awful devastations by disease in the past (as described), and (*b*) East-Coast fever and other tick-borne diseases in the present. As regards this latter, I am of opinion that this district is one of the most heavily infected in East Africa. It is considered that about 60 per cent. of calves born every year succumb through this cause, and that approximately 5,000 head die annually from it. The result is that breeders can get "no forrarder," and are gradually losing all interest in their livestock. It is such an unprofitable business, and before any improvement can be looked for it is absolutely essential that East-Coast fever be eradicated as far as possible, and until that can be accomplished it is

* Pombe means beer.

idle to talk of serious advancement in stock-raising. Bulls—either pure-bred or grade—if imported, would die within one month, as also would any cattle brought in from an East-Coast fever-clean area. This also applies to sheep.*

As regards stock for slaughter, there is a huge trade, and the district is capable of consuming about 500 a month (cattle), but 75 per cent. of these animals are infected with trypanosomiasis, or East Coast fever, by the time they arrive here, and consequently have to be killed off quickly. Frequently they are slaughtered *in extremis*. It is the custom for the petty traders who engage in this business to hawk their cattle round the villages and sell the meat in exchange for coffee, etc. It is during the coffee season that this trade is at its height (May to September inclusive), and prices soar from an average of 70s. per head to an average of 130s. The district at present cannot possibly provide the required number of slaughter cattle, and because the Biharamulo boundary is closed the only route open to traders is across the lake district from Mwanza to Bukoba by lighters or dhows (the cattle having undergone fourteen days' quarantine and been inoculated with anti-rinderpest serum). Up to date, this route has not been availed of by the natives, and only one dhow-load has arrived during the past twelve months, the stock being owned by a European in Mwanza.

This state of affairs has naturally led to increased illicit movement from Belgian Urundi and Usukuma, through Biharamulo into Bukoba, and it is this trade which constitutes a very dangerous menace to the Bukoba herds on account of the risk of introducing rinderpest.

Animal Husbandry.

As I have endeavoured to point out, the Bukoba native is losing a great deal of his interest in his livestock. The general practice is for the "totos" † or the women to herd the cattle, whilst the able-bodied men remain behind to indulge in bouts of pombe-drinking. The cattle are taken from the houses (where they sleep with the rest of the household) at about 10 a.m. and raced down to the nearest watering-place—to increase the milk supply. They are then grazed wherever the totos find a nice comfortable place to sit or play, and returned to their houses at about 6 p.m. There is usually no attempt made to select good pasturage, and the animals are more or less left to fend for themselves. Contrast this state of affairs

* Since writing the above, dipping has been instituted with entirely satisfactory results. The attitude of the natives in regard to the dipping of their cattle has changed from being suspicious and almost antagonistic to a mild enthusiasm which is all we could hope for.

† Children.

with that obtaining prior to the rinderpest epidemic of 1889, when cattle were the alpha and omega of native life. The practical application of the science of animal husbandry is rapidly becoming a lost art amongst the local natives. Castration, until very recently, has not been practised chiefly on account of superstition, but this is being gradually overcome, and a native castrator has now been added to the staff of the veterinary department in the district, and already he has done remarkably good work.

The cattle of Bukoba proper are for the most part of the long-horned, straight-backed, Ankole type. They give very little milk; an average daily milking would run to about 3 to 5 pints, or about 100 gallons in a year. The average lactation period is roughly seven months. This compares unfavourably with Usukuma cattle. There are two milkings every day, once in the morning before the cattle go out to graze, and once when they return in the evening. There is not a great difference between these milkings, but sometimes the cows give more in the evening. The milk is collected in wooden vessels (hollow tree-trunks), and prior to putting it in, it is well smoked just to give " bouquet " to the milk. This wooden vessel is called a kianzi, and is provided with a lid, which is separate, and which is used to keep the smoke in the kianzi until the next milking. The butter is then removed by placing the milk in a large kibuyu (gourd with a long narrow neck) and shaking for half to one hour, according to the quality of the milk. The liquid milk is then drained off, cooked and eaten, and the butter is shaken out and placed in a banana leaf, and later is smeared over the body. Very little butter is actually eaten by the natives. From four full kianzis (about 1 gallon) it is reckoned to get about 1 pound of butter, which is valued at 1s. to-day.

The grazing of Bukoba is for the most part poor, due probably to there not being sufficient cattle to keep it grazed down, and also in part to indiscriminate burning.

When a calf is born it is not allowed to go outside the house for three or four months in case it contracts East-Coast fever or other infection, and for the two succeeding months it is grazed by itself or with other calves, but not with the herd. The calves are allowed to suckle their mothers all this time, and a little grass is brought into the house for the calf to eat. This practice of housing the stock together with the family all in one hut (but in separate compartments) is due to (*a*) the tribal wars in the past with raids on cattle, (*b*) the fear of theft, and (*c*) probably most of all to the frequent inclement weather which prevails in the district, and which precludes the stock being kept outside in a boma, and the building of another

house for the cattle is beyond the average native, and besides the number of cattle which he possesses would not justify the expenditure in labour or money.* As I have mentioned before, it often happens that one beast is the property of two, three, or more people. Such a cow is kept at one of the owner's houses until it gives birth, after which it is sent round to each owner in turn, each keeping it for one month. Any progeny is again divided amongst the owners, or rather is given to the owner who takes the greatest fancy to it, and by so doing he forfeits all further interest in the partnership. This dissolution of partnership is not undertaken until the original cow has given birth to the number of calves equal to the number of owners less one. That is to say, that the total calves plus mother is equal to the number of owners. This only refers to female calves; but if a mere male happens to be born, it is killed or sold at the age of one or two years and the meat or proceeds divided, or perhaps one owner may take it to his Sultan, who slaughters it, and in return gives the owner one female beast.

It might be imagined that this plurality of ownership would give rise to constant litigation in the courts on account of disputed ownership, but I understand that there are remarkably few such cases in Bukoba.

The local natives do not eat fowls or eggs, except the very young children. The witch doctors and medicine men use them (the poultry) for divining purposes. Latterly some people keep hens and eggs for sale to Europeans.

The Future.

(*a*) Biharamulo.—This sub-district is so backward that I am of the opinion that what is most required is careful and quiet administration, and above all vigilant supervision. The area requires more food in the first place before it can hope to entice the advent of civilisation. It also requires efficient protection from the introduction and spread of such cattle diseases as rinderpest. By firm but gentle management these people can be gradually led from darkness into light, and to this end it seems to me that continuity of policy is essential. The progress will necessarily be slow and tedious. The sub-district has, as far as is known at present, nothing of commercial value either in agricultural crops or in minerals, and hence its future depends to a very large extent on the livestock.

Tse-Tse Fly and Trypanosomiasis.—The investigation and eradication of this pest is particularly urgent in Biharamulo, especially

* Another probable reason for housing the livestock with the family is that by their urination and defæcation they keep away *Ornithodorus moubata* (ticks), which carry the organism of relapsing fever.

in the Sultanate of Usambiro, and also Kimwani, where large areas of valuable pasturage are lost to stock. If any progress is to be made in the future the following points will have to receive earnest attention :—

1. The conservation of present herds and their protection from preventable disease such as rinderpest, trypanosomiasis, East-Coast fever, etc.
2. The control and ultimate eradication of preventable human diseases, with particular reference to infantile mortality and child welfare.

Given these two points, the human population and the number of livestock would soon increase enormously. The surplus population would then be forced by economic pressure into the fly belts, where they would make their gardens, cut down the bush, and keep it down and so drive off the fly. Sheep and goats (which are far less susceptible to trypanosomiasis than cattle) could be introduced and later the cattle, when the area has been definitely cleared. By such peaceful penetration the tse-tse fly menace would gradually disappear.

It would probably be found that certain portions of the fly belts would not be suitable for re-population on account of a shortage of water or other cause, but I think that these difficulties could be overcome as time went on.

Another question in this regard is the construction of fly-free routes for cattle coming through from other districts. These animals bring the infection into fly-free areas, and every beast infected with trypanosomiasis is a danger to its fellows, through the medium of biting insects other than Glossinæ, such as (*a*) Tabanus, (*b*) Hæmatopotæ, (*c*) Culicidæ. The construction and especially the upkeep of such roads would be expensive, but it would be well-spent money. The bush on either side of the road would have to be cleared for a distance of 300 to 500 yards. This would cost on an average about 400s. per mile (depending on the type of country and quality of the labour and also the supervision).

In connection with the eradication of tse-tse fly the question of game arises (as it also does in regard to the suppression of rinderpest). I do not think that the indiscriminate shooting off of the game would make any appreciable difference in areas where the fly has already established itself, but I do think that it conduces to its spread. It must be remembered that there are areas where there is exceedingly little or no game, and yet the tse-tse flourishes, and on the other hand there are areas where there is plenty of game and no tse-tse. In Biharamulo there is little game. On the whole game is a menace

to stock-raising in that it provides a food reservoir for animal parasites such as ticks, tse-tse, etc., thus enabling them to live and to propagate their species. The game may also introduce contagious and infectious disease to the herds, and consequently the preservation of game and animal husbandry are incompatible; but at present the question is not one of great importance in this district.

The control and eradication of tse-tse fly is one of the most urgent matters to be dealt with, and unless some forward policy is instituted against this pest, it will spread and ruin the livestock industry in the district.

(*b*) BUKOBA PROPER.—The whole question of animal husbandry is so inextricably intermingled with general native administration that invariably one reflects upon the other.

The habits of the population need to be changed. The cultivation of cereals, such as maize, matama, etc., for food should be encouraged gradually. Such a change would be difficult to effect.

The most urgent need in the district is dipping tanks for the suppression and eradication of East Coast fever and other tick-borne diseases of stock. It is rather much to expect of a native to take an enthusiastic interest in cattle if he stands to lose three calves out of every five from East Coast fever and the remaining two run the gauntlet of various other diseases and accidents. More tanks should be built until every beast can be dipped regularly.

Each tank would require an efficient staff (two or three) to work it, and of course strict supervision by the veterinary department, testing, etc. The upkeep of the tank (including staff) should be met by the natives themselves by charging a small fee per head. After dipping had been in vogue it would probably be necessary to make it compulsory within a certain radius from the tank. It would require the most efficient supervision over the (*a*) collection of dipping fees, (*b*) seeing that all cattle in the area were regularly dipped (at least once a week), (*c*) testing the dipping-fluid. These laboratory tests would have to be made at regular intervals, because the line between the strength of the fluid which will kill the ticks and that which might harm the cattle themselves is rather fine. It is obvious that a too weak solution is useless.

Dipping, to be effective, must be universal, and it should be remembered that cattle in the dipping area will die if they are removed to an enzootic one, i.e. outside a dipping area. Hand-picking of ticks has been tried, but it is not successful on the whole.

Castration and Dishorning.—The people are slowly awakening to the benefits which accrue from castration, and the services of a native castrator have been acquired by the department. He has

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already done very good work. Dishorning ought to be encouraged, because the long horns of local cattle use up a lot of energy which should go to the formation of more valuable products such as meat, bone, and milk.

The control of movements of livestock is one of the most important matters which require attention. Through this means alone can it be hoped to prevent the introduction of disease. Properly demarcated stock routes have now been defined into the district and none others allowed. The present permit system, as applied to Bukoba, is as satisfactory as can be expected, but without an enlightened public opinion very little can be accomplished, and for the creation of such opinion it is necessary to educate the people by talks and by lectures to the school children on all aspects of animal husbandry. For this purpose the practical example of a Government farm would do more than any amount of simple precept.

The more experienced and intelligent native veterinary guards are now having a more technical training, and they in turn are being used for propaganda work on such matters as—

1. The proper method of skinning and drying hides.
2. Castration and dishorning.
3. Post-mortem technique and the elements of anatomy and obstetrics.
4. The taking of blood-smears, and the simple laboratory technique.
5. Elementary entomology, ticks, tse-tse, etc.
6. The general science of animal husbandry and stock-breeding.

The people need more and more education on such subjects as the selection of bulls, the improvement of the milk and meat supply, dairying, ploughing with oxen, the use of ox transport, the improvement of sheep farming, especially for wool and mutton, etc. (building of separate houses for the stock and better sanitation, especially amongst the natives, in order to reduce and abolish the incidence of cysticercosis in the meat). In this connection I understand that a large number of the population are infected with *Tænia saginata* (a flat segmented worm which may reach the length of 30 feet and which is propagated through the stools) through eating raw or insufficiently cooked meat which is infected, and this may be responsible for the enormous number of intestinal troubles, although the diet of bananas may also be held accountable. I venture to opine that if animal husbandry were to be given the attention which it deserves by the Bukoba native, he would have far less time on his hands than at present, and that a far better and stronger race would result.

ARTIFICIAL FECONDATION AS A ZOOTECHNIC METHOD.*

By Professor E. IWANOW,
Moscow.

Up to the time of writing artificial fecondation had occupied very little attention from zootechnicians. It has been useful at times in gynæcological and veterinary practice as one of the methods to overcome sterility. The extension of its zootechnical application has been hindered not only by the imperfection of the technique (American method—where the spermatic fluid of the stallion is collected from the vagina of a mare being covered with a long and clumsy glass syringe enclosed in a metallic casing ; the fluid is injected with this same syringe into the same mare, and if possible into the neck of the uterus of one or two other mares) adapted only to the horse, and the obtaining of an insignificant quantity of spermatic fluid, but also by the insufficient theoretical elaboration of the question and the belief that the vigour, health, and fecundity of the progeny of mares artificially inseminated are not equal to naturally obtained foals.

Artificial fecondation as a zootechnic method, based in the first place on the most extensive use of prize stock for the improvement as a whole of the races of domestic animals, was undertaken and applied in Russia on a big enough scale before the war ; to-day it has developed on a still larger scale.

The practical application had preceded the experimental control of the technique which we elaborated, and the elucidation, also experimental, of a series of scientific and practical problems. We established that besides artificial fecondation by natural sperm, first declared by Spallanzani, it was possible to fructify mammifera artificially by " artificial sperm," spermatozoids obtained from the epididymus and placed in a solution favourable to their vitality (physiological salt solution, Locke's liquid, Ringer's solution, etc.). This method of fecondation, formerly considered impossible (Steinach), has been above all largely carried out on the small animals of the laboratory in which the obtaining of sperm in its natural state presents, thanks to the small size of the animals and the insignificant quantity of sperm emitted, certain inconveniences and difficulties. In zootechnic practice this method of fecondation is applied in case of complete mutilation of a prize male, or even of its sudden death due to non-infectious causes, as, for instance, in the case of spermatozoids obtained from males killed at the abattoirs for meat, among which there are a good number become useless as reproducers owing to heavy weight, or even from spermatozoids of a wild male animal killed in the chase.

* *Recueil de Médecine Vétérinaire*, Tome C, No. 14.

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The spermatozoids of mammifera remain in the testicles of dead animals at a temperature round about 0° C., and retain their motility for ten to twelve days, and are capable of fecondating at least twenty-six hours *post-mortem*.

The technique of the method is simple : some incisions with the scalpel are made in the canaliculi of the epididymus of the testicle, or their envelopes ; the mass thus obtained by scraping the walls with the same scalpel or with a surgical curette is rinsed in one of the solutions mentioned previously until the liquid no longer takes a milky hue ; it is then injected with the aid of a catheter and convenient syringe into the vagina or neck of the uterus. The technique which we have elaborated for artificial fecondation by natural sperm is designed in the first place to obtain the whole of the sperm to fecondate the largest number of females. A small and very fine sterilised sponge is inserted into the vagina of a female in rut. The male covers the female. The sponge soaked in seminal liquid is pressed and the sperm thus obtained is introduced into the neck of the uterus of other females by means of a syringe and elastic catheter with a narrow canal and pointed extremity. The entire operation of artificial fecondation is made with the instruments and a sterilised sponge whilst the presence of spermatozoids and their motility are controlled microscopically. To sterilise the sponge it must be carefully washed and pressed, be put for half an hour at least in a solution of ethylic alcohol at 70 per cent. ; it is afterwards strongly pressed, and the residue of the alcohol in the sponge is washed out in boiled water after it has cooled ; the sponge is then soaked several times (each time with pressure) in a solution of sugar and NaCl (1 part of physiological solution to 9 parts of a 9 per cent. solution of sugar). The metallic instruments (mirror, forceps, etc.) are flame sterilised and the catheters and syringes steamed. The quantity of semen thus obtained from stallions amounted in certain cases to 300 c.c. ; the average was 100 c.c. ; the average dose for injection was 10 c.c.

Preliminary trials were made on over 500 horses, without taking count of horned beasts and laboratory animals. It was proved beyond doubt that by our method of fecondation one could fecondate 300 to 500 mares from one stallion in a season in place of 30 to 50 ; that the percentage of conceptions and births, far from being inferior in this case, were superior, and that under favourable conditions they reached an average of 78 to 79 per cent. instead of round about 50 per cent., as previously observed under natural conditions. We have applied artificial fecondation to horned beasts, pigs, dogs, foxes, where this method has special importance for production of black and silver foxes.

It has also been employed to fowls and other birds. In numbers of cases of sterility due to anomalies of the female genital organs artificial insemination by our method has often given good results. The injection of semen is made immediately after being collected, for our observations have shown that the spermatozoids of natural semen of stallions commence to deteriorate after two to four hours and to lose their motility.

From 1909 to 1914 this method has been largely used in Russia, and during a period of four years about 7,000 mares have been artificially inseminated.

Three practising veterinary surgeons, following out the Government's instructions, have artificially inseminated 209 mares with an average of 77·1 successes.

Russia is at present very, very poor in stallion reproducers capable of improving the breed, and the same applies to horned beasts, so that the method is exceptionally valuable to her. Japan, Germany, Hungary, and Czeko-Slovakia have already begun to adopt the Russian method.

It is necessary to note, in conclusion, that to the method of artificial fecondation is allied the progress of our physiological and biological knowledge of fecondation. As, for example, the obtaining of semen of animals in sufficient quantity and without difficulty has allowed of the making of an exact chemical analysis of the semen of the horse and dog; of the determining of the specific weight, its freezing-point, its electro-conductivity; of the studying of the biological properties of the spermatozoids of domestic animals; of watching the process of ejaculation and clearing up the important properties of the different liquids of the annexed sexual glands. The solution of these problems possesses, besides scientific interest, a great practical significance, and gives a scientific basis to the more rational development of coupling a process up to now left chiefly in the hands of indifferently informed men, bound up in empiricism and routine.

Clinical Articles

SOME FORMS OF INDIGESTION MET WITH IN CATTLE.

By W. T. HEWETSON, M.R.C.V.S.,
Brampton.

THE first case which I am about to describe was that of a two-year-old blue grey heifer which was taken ill in the latter part of September. She was found to be low in condition, emaciated, tucked up in the flanks, hide-bound, and she had almost lost her appetite. The breath-

ing was normal, temperature 103° F. ; the bowels were loose, the fæces being passed in smaller quantities than when normal, and having an unpleasant smell.

On close observation, occasional drops of saliva were seen to drop or dribble from the mouth. When the spine was compressed with the finger and thumb behind the shoulder, the patient cringed and almost sank to the ground.

Though the animal was scoured, I formed the opinion that it was suffering from a stoppage of the bowels. In cases where diarrhœa is present, it is often difficult to say definitely whether the case is one of diarrhœa, or one of stoppage. The diagnosis was arrived at from the following symptoms : The animal dribbled saliva occasionally from the mouth ; when the spine behind the shoulder was compressed, the animal cringed almost to the ground ; and the evacuations when newly passed had a putrefactive smell. The smell was not the peculiar and distinct smell that is met with sometimes in young cattle that are scouring and whose hides are licked almost all over. The odour of the dung of these is generally characteristic and recognisable, and I believe their condition, though similar, and the diarrhœa present, is due to worms, or internal parasites, and not to a stoppage.

The owner informed me that this heifer was in excellent condition when turned out to grass in the spring, but that she had not thriven or grown like the other cattle going in the same pasture.

The heifer was placed in a loose box, without bedding, the floor being dry and clean. She was comfortably sheeted, and 3 pounds of treacle in warm water were administered. Also a powder containing ammon. carb., sodæ bi. carb., mustard, and nux vomica pulv. was given in a quart of cold water. The heifer received afterwards 2 pounds of treacle and the above powder twice daily. The owner was directed to allow the heifer only laxative diet, namely, scalded bran, boiled linseed, calf meal and milk, and on no account to give any dry food, grass, hay, straw, or dry meal. Water was given with the chill off in small quantities and often.

The heifer was visited again in three days. On examining the dung that she had passed, it was found to contain many pickles of corn. The attention of the owner was drawn to this, and he was told that he should not have given the heifer crushed oats, as I concluded he had given her oats imperfectly crushed. He said : " She has been fed as you suggested. She has not received any oats, crushed or uncrushed." On being asked how he accounted for all the pickles of corn in her dung, he replied : " This is most remarkable. I can account for them being there in one way only. The evening previous to turning all my cattle out to grass in the spring, I had completely

used up all my hay, and I had not any oat straw, but I had plenty of corn sheaves. Consequently I gave them all a foddering of these. They were given also a similar foddering in the morning. Later they were turned out on grass, and they have been there ever since. They were turned out in the early part of May." He informed me there was no possibility of the heifer gaining access to a cornfield, as she had always been in the same field with the other cattle. She had never been known to stray, and there was not any cornfield near. The corn she has lately passed must have been retained in her stomachs and bowels from the month of May until now, the middle of September, a period of four months. This gives one an idea as to the length of time ingesta can be retained in the stomachs and bowels.

In this district it was a general practice twenty or thirty years ago to give every newly calved cow an oat sheaf immediately she calved. This is anything but a good practice, as the oats may fall to the bottom of the rumen, after becoming sodden, and lie there for a considerable time, unless they are lifted with the other ingesta in the act of chewing the cud. If they should lie for any length of time they will ferment, and give rise to indigestion, followed by symptoms found in the heifer.

The simple treatment prescribed brought about a complete recovery after a period of three weeks. Some practitioners might have preferred linseed oil and not treacle. Personally I prefer treacle, because I consider linseed oil a very weak and poor laxative in all ruminants, and it is nauseating, whilst the action of treacle as a laxative and purgative is more certain, and it is more of a tonic, stimulant, and nutrient. Cattle will live a long time without any food if they are receiving treacle daily as a medicine.

Another form of indigestion, which is well known by those who are called upon to treat cattle, is met with in milch cows in winter time, when they are three to five weeks calved. The complaint goes by the name of " the retention of the second cleansing." I do not think the cleansing has anything to do with the cause of the disease. I am of the opinion it is due to a chill, by being exposed to draughts of cold air, seeing that the cow standing close to the door is most often affected ; large drinks of cold water also are a predisposing cause, and frozen turnips.

The first symptoms to be observed may be rigors. The cow falls in her milk yield ; she eats sparingly, and ceases to chew her cud, but is heard to grind her teeth occasionally. Her breathing and temperature are usually normal, though sometimes you meet with cases where the temperature is 105° F. Here again the animal cringes when the spine is compressed behind the shoulder, and may at the

same time emit a slight grunt ; and saliva may be seen to dribble from the mouth. The dung is passed in smaller quantities than normally, and when examined it appears coarser, not so finely ground, as if the food had not been thoroughly masticated. In a very few days the flesh seems to fall off—a fat cow with this complaint is soon a lean one.

The case at first sight appears a simple one, and not until treatment has been applied does it appear how obstinate it can prove. All such cases would end fatally if not treated, yet very few cases die when properly treated. The cow in the first place must be comfortably sheeted and a dose of mag. sulph. gentian or ginger, sweetened with treacle, is given at the commencement, followed by 6 to 8 pounds of treacle daily, 3 to 4 pounds given in the morning, and 3 to 4 pounds given in the evening, dissolved in a quart of warm water. This complaint is due to paralysis, or partial paralysis of the digestive system. The bowels do not function properly, and a poison is generated from the retained ingesta undergoing more or less decomposition. The paralysis must be overcome, and the stomachs and bowels relieved. Nerve stimulants and antiseptics are necessary, such as nux vomica, ammon. carb., sodæ bi. carb., and gentian. The chief thing is to clear the bowels of all the retained ingesta by keeping them open until all the poison has been removed. This takes time, in some cases a month or even more. It is better in these cases to use mild purgatives, such as treacle or oil, than drastic ones that are not nutrients.

Feed the patient on laxative diet only, withholding all fodder, such as hay, straw, or dry food. Sodium chloride should be added to the diet, and an occasional handful placed in the mouth, as it acts as an antiseptic and encourages the patient to drink. When a cow is once purged, it must not be taken as an indication that her bowels are cleared out, as is the case with a horse. A horse cannot stand repeated purging, but a cow can. And in these cases the dung must be kept similar in consistence to that passed when on grass, for a time, or until recovery has been completed. That is until all the unfavourable symptoms have disappeared, such as grinding of the teeth, cringing, non-chewing of the cud, and until the appetite has been completely restored.

Another form of indigestion of a more acute type occurs in dairy cows that have been marketed. Previous to going to the auction, they are engorged with tempting food of every description so that they may appear to the best advantage. And when at the auction they may be exposed to draughts. Some are very excited, and do not chew their cuds. Some have to travel long distances by rail

and by road, often deprived of water. And some, when driven, become excited, and may gallop, rush through fences or into ponds when in a heated condition, before reaching their destination, and as a consequence they are affected in the course of a few days with an acute form of indigestion. They may eat one or two meals, then they go off their food and become feverish. In some cases one or more quarters of the udder becomes inflamed, and unless medical advice is called in at the commencement many of them die. This often leads to much vexation, trouble, and litigation between the buyer and seller.

Such a case requires more drastic purgatives than the two previous forms of indigestion. They also require febrifuges and diuretics.

As a preventative, all dairy cows coming from an auction, or having travelled long distances by rail or by road, should have a dose of physic given to them on arrival at their destination, and be placed on a laxative and restricted diet for three or four days.

A CASE OF CANINE SPIROCHÆTOSIS ICTEROHÆMORRHAGICA WITH SPLENIC HÆMORRHAGE.

By TOM HARE, M.B., Ch.B., B.V.Sc., M.R.C.V.S.,
The Thompson Yates Laboratories, the University of Liverpool.

Subject.—Sealyham terrier bitch, aged five years.

Former History.—The patient, a great pet with the owner's family, had been treated for digestive disorder on six different occasions during her lifetime by the veterinary surgeon, to whom I am indebted for the clinical information. Otherwise the bitch had never ailed, also she had never been served.

Clinical History.—The owner, a doctor, stated that on June 28th the patient appeared perfectly normal, but on the following morning he found her very ill. She appeared listless, sought quiet corners of the room, and refused all food and attention. On June 30th the veterinary surgeon was called in, to find the patient very weak, shivering, and profoundly anæmic ; the pulse was weak and thready ; there was no diarrhœa and no vomiting. The temperatures were not recorded.

On the morning of July 1st the patient appeared very much worse, and was now markedly jaundiced. In the evening she became prostrated, and was removed to the surgeon's infirmary, where she died in a comatose state at about 8 a.m. on July 2nd.

Post-Mortem Findings.—Unfortunately the carcase had been opened, most of the organs disturbed, and no precautions to preserve the tissues taken ; so that when brought to the laboratory some

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forty-eight hours later, putrefaction, aided by the very hot weather, was well advanced. The conjunctivæ were icteric, while the bright greenish-yellow diffuse dyeing of the subcutaneous tissues was most marked through the normal skin. The mucous membranes of the nasal and buccal cavities appeared normal. The third upper right molar tooth was carious, and all the teeth were thickly coated with tartar. The carcase was well nourished. There were no hæmorrhages in the subcutaneous or intermuscular tissues of the trunk and neck. No free fluid was present in the abdominal or thoracic cavities. The stomach contained a few pieces of semi-digested food, and the

Photograph of the Dog's Spleen, showing the Distension of the Capsule from the Recent Hæmorrhage into the Pulp.

contents of the small intestines appeared to consist solely of bile-stained mucus. The large intestine and rectum contained a little liquid, but normally coloured fæces. There were no lesions of the mucosa, mesentery, or associated lymphatic glands of the entire alimentary track.

The liver, weighing 195 grammes, was very pale and friable, but advanced post-mortem changes masked any possible macroscopic changes. The gall-bladder and ducts containing golden-red bile revealed no abnormality. The spleen, weighing 220 grammes, was the seat of a recent hæmorrhage. The middle third of the organ, surrounded by an intact though stretched capsule, was occupied by a massive oval swelling of a deep purple colour, about the size of a hen's egg, and of a fluid consistency (*vide* photograph). On making a median

cut through the tumour a red varying to purple-coloured mushy central mass of blood-clot, surrounded by a thin periphery of fragmented pulp, was revealed. The remainder of the splenic pulp was very much congested and friable. No abnormalities in the splenic vessels or portal vein were found. Both kidneys were paler than normal, the differentiation between cortex and medulla was indistinct, but the capsule stripped easily. The remainder of the genito-urinary tract, also the pancreas and suprarenals gave negative findings. The heart was paler and broader than normal; all its cavities were filled with serum clots ("agony thrombi"), no post-mortem blood-clots being present. Less than normal blood-clot was found in the large veins. The valves, endocardium, and coronary arteries appeared unaffected. With the exception of the rather abnormal pallor of the lungs, all the remaining thoracic organs revealed no pathological change.

Bacteriology.—Culture preparations were deemed impracticable in view of the decomposition of the tissues. The bladder contained about 5 c.c. of orange-coloured alkaline turbid urine, which gave negative results both to Gmellin's and the Van den Bergh tests. Albumin was present. Drops of the centrifuged sample of urine examined by dark-ground illumination revealed morphologically typical leptospiræ, about one to every field. Similar leptospiræ, but only one to every fifth or sixth field, were found in saline emulsions of minced liver. Both in the urine and liver the leptospiræ were motionless. Emulsions of the spleen pulp proved negative. Films made from the urine and liver juice, and stained by the Indian ink method, revealed leptospiræ, usually curled up in the form of pothooks. The centrifuged deposit of the urine was emulsified in 2 c.c. of the urine, and injected intraperitoneally into a guinea-pig; also 2 c.c. of liver emulsion were injected intraperitoneally into a second guinea-pig. During four weeks' observation neither animal showed any evidence of disease, while samples of their urine were taken at the end of the second and fourth weeks following inoculation, but revealed no evidence of leptospiræ.

Histology.—No leptospiræ were found in sections of the liver, kidneys or spleen stained by Levaditti's method. Advanced decomposition masked the histology of the liver sections stained with hæmatoxylin and eosin. The kidneys showed cloudy swelling, and the sections of the spleen mainly consisted of blood cells in all stages of breakdown.

Discussion.—The localisation of hæmorrhage to the spleen leading to the complete disorganisation of the pulp is an interesting feature of the case, as well as being an unusual lesion of this organ. A further

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point of interest was the absence of motility revealed by the morphologically typical leptospiræ in the urine and the liver emulsion. This latter observation, coupled with the failure to infect the two guinea-pigs, suggests that the leptospiræ had died by the time the post-mortem examination was made. Yet another problem is found in the presence of jaundice in the conjunctivæ and subcutaneous tissues, while bile pigments were absent from the urine.

Abstracts of Current Literature

Dildine, Captain Seth C.—Results of Working Machine-Gun Mules without Hind Shoes.—*Veterinary Bulletin, U.S. Army*, Vol. XVI, No. 4, October 14, 1925.

In July 1922 the hind shoes were removed from the mules of one of the machine-gun companies of the 23rd Infantry, the hoofs trimmed, and the edges of the walls rounded to prevent them from breaking and possibly injuring the sensitive laminæ. The hind feet were left unshod, and the mules were used the same as in the rest of the companies, doing their work just as well and with no bad results from being barefooted.

The following month it was recommended that the hind shoes from all the machine-gun mules of the entire regiment be removed. One company immediately carried out this recommendation, but the others waited another month, as they were afraid the animals would not stand up under the training then being given preparatory to the full manœuvres. However, the animals did their work very nicely without hind shoes, and we did not have a lame mule.

In the company which last removed the shoes, the feet of the mules had not yet toughened at the time the manœuvres began, but in spite of this the animals were taken over a hike of about twenty-five miles and then manœuvred for ten days over hilly, stony ground with no resultant injuries whatsoever. Eight trips over this same terrain, six for target practice and two for manœuvre periods, lasting from ten to fifteen days, have since been made in addition to garrison work and practice marches, and the feet of all the mules are in excellent condition.

At the time of removal of the shoes, quite a few of the mules' feet were contracted, the frogs almost non-existent, and a few cases of thrush present. At this time there is not a contracted foot in the three companies, the frogs are large and healthy, and we have not had one case of thrush. Thrush, however, is not very prevalent at this station (Fort Sam Houston, Texas), but nevertheless we have had quite a few cases in animals which were shod. Also the walls

of many of the machine-gun mules' feet, which were so brittle that in a few instances considerable difficulty was experienced in keeping shoes on for the regular period of one month, became toughened with the removal of the shoes, and the only attention at present necessary is the trimming down of an occasional flare or the straightening of a crooked foot; the mules are worked enough to obviate the necessity of much trimming. After removal of the shoes an animal's foot comes down where it can get plenty of frog pressure, and the bare foot cleans itself frequently, both essentials to a healthy normal foot. It is also noted that without the hind shoes an animal does not slip as much on smooth roads, and fewer wounds caused by kicking while tied on picket lines and in corrals are in evidence.

A considerable amount of labour is also saved, since the three machine-gun companies have a total of fifty-one mules, which would require an additional 102 shoes per month, or for the approximate thirty-two months which our animals have been unshod a total of 3,264 shoes. Counting four shoes per animal, the above would equal a total of 816 animals on which labour was saved. It would take the average horseshoer in the Army, shoeing anywhere from two to four animals per day, from 204 to 208 days to have kept these animals shod, and not having had this work to do he has been able to devote more time and care to the remainder of the animals in the regiment, and we have had less foot trouble.

There is a material saving in money also, since 3,264 shoes, weighing approximately 4,284 pounds, cost $214.91, and the number of nails required, 26,112, cost approximately $23.49, or a total cost of about $238.40 for material, with no allowance for wastage.

The results of leaving the hind feet of machine-gun mules unshod have been very favourable in our experiment to date, and we intend to continue and extend this system to other organisations.

Sande, Dr. K. von.—Intrauterine Infections.—*Z. für Infekt-Krank. d. Haust.*

FOR the occurrence of intrauterine infections in animals Sande has carried out investigations on mares, cows, and small animals. The fœtuses have disclosed new examples of infection. In thirty-three fœtuses there were pathological changes in different organs from which almost without exception different bacilli could be bred (Bang's abortion bacilli, paratyphus, coli, and proteus bacilli).

Sande succeeded in infecting the fœtuses of small pregnant laboratory animals by infection of the mother. He found that pregnant cows infected with the swine erysipelas bacillus (with the object of obtaining erysipelas serum) soon had dead calves cast.

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The entrance of bacteria through the placenta can probably only occur when more or less severe changes occur in it. In part of the cases the changes were macroscopic, for example abortion and tuberculosis; in part of the cases they were microscopic, and due probably to bacterial toxic injury to the wall of a bloodvessel.

Review

Ministry of Agriculture and Fisheries Report of the Departmental Committee on Export of Horses to the Continent. Presented to Parliament by Command of His Majesty. London: H.M. Stationery Office, price 1s. net.

For many years the subject of the export of horses to the Continent has been commented on, discussed, and debated in the Press. Argument against the traffic has frequently been unfair and unreasonable, and in a large measure been governed by sentiment and exaggeration rather than fact. In some cases it seemed as if horse dealers, veterinary surgeons, shippers and slaughterers were all condemned as men of great cruelty, who didn't know their business, and were callous to all the finer feelings in regard to the comfort, health, and ultimate dispatch of the horse. Assertion without proof has been so frequently advanced as evidence by the decriers of the traffic that it is really refreshing and praiseworthy that a lengthy and judicial report *founded on evidence* should now see the light of day.

The Committee held sixteen meetings and took evidence on thirteen days. Those who gave evidence are listed in the Report, and they comprise well-known men in equine trade and traffic matters, the veterinary inspectors of the Ministry of Agriculture, farmers, and representatives of the Humane Societies. The Committee sifted the evidence given by these witnesses, and the result is the publication of this pamphlet as the considered view and judgment of the persons appointed by the Minister of Agriculture and Fisheries to inquire into the conditions of the export trade in horses from Great Britain to the Continent.

In 1910 an Act was passed placing on the Ministry of Agriculture the responsibility for the veterinary examination of horses presented for shipment. At that time there were seventeen ports from which horses were shipped to Europe. The duties were allotted by the Ministry to private practitioners, and special shipment officers were appointed, and a supervising veterinary inspector with a permanent post.

Under the Act of 1910 a veterinary inspector of the Ministry had to certify that any horse exported was capable of being conveyed and disembarked without cruelty, and power was given to him to slaughter any horse that it was cruel to keep alive. The master of the vessel had to carry a proper killing instrument to use on horses seriously injured in transit and incapable of being disembarked without cruelty.

In 1914 the Exportation of Horses Act was passed, which obliged the veterinary surgeon to stop the export of any horse unless it was " capable of being worked without suffering," and it also required him to order the immediate slaughter of rejected horses which he found " to be permanently

incapable of being worked without suffering" as well as those it was cruel to keep alive.

The Act of 1910 as amended by that of 1914 is in force to-day, and no horse may be shipped unless it is certified by a veterinary inspector of the Ministry as "fit to be conveyed and disembarked without cruelty, and to be capable of being worked without suffering."

So far it will be seen that this country was worthily endeavouring to uphold its reputation for humanity. In February 1921, owing to allegations that unfit horses were being passed the Ministry appointed Mr. E. Peacey, F.R.C.V.S., to inquire into the condition of the horses which were arriving in Europe from England. The veterinary inspector found that some of the horses from the northern ports were not up to the required standard of fitness. As a result the Ministry placed whole-time inspectors at the principal ports of shipment; raised the standard of fitness at all ports so as to comply with the Acts, and placed the traffic under the immediate supervision of one of the Ministry's senior veterinary inspectors.

In 1921 an Order entitled the Exportation and Transit of Horses, Asses and Mules Order was made. It dealt with the fittings on board ship, and prescribed standards for fittings and laid down provisions for feeding and watering of horses in transit.

The Order of 1921 limited the ports from which horses could be imported to the following: Folkestone, Goole, Harwich, Hull, Leith, London (including Tilbury), and Southampton. At each of these ports (with the exception of Leith, where the veterinary inspector is a Professor at the Royal Veterinary College) full-time veterinary inspectors of the Ministry are stationed for the purpose of examining horses.

One of the finest tributes to the soundness and humanity of the present day horse traffic, and to its good record in the past, is furnished by the table of statistics given in the Report. It is as follows :—

Year.	Horses Carried.	Casualties.	Percentage.
1921	45,120	68	0·151
1922	17,941	27	0·150
1923	17,067	24	0·141
1924	25,645	16	0·062

It will be seen that during the four years 105,773 horses were carried, and that there were only 135 casualties.

The landing arrangements on the Continent, the methods of killing, the abattoirs at ports of shipment, and the carcase trade, are all reviewed and commented on in the Report.

The Humane Societies, judged on the evidence, seem to come out of the inquiry badly. The testimony of a Mr. H. Smith, officially representing the Council for the Protection of Animals, Manchester, is wholly discredited and his evidence characterised as "obviously untrue."

The Equine Defence League (which circulated pamphlets asserting that "blinded and shattered pit ponies, cast army horses, and those too

painfully diseased to be seen in England are being roughly shipped to the Continent") is censured and its statements characterised as "untrue and the reverse of truth." The R.S.P.C.A. did not substantiate its contention that the carriage of horses by sea inevitably involved suffering; and as regards the ghastly and horrible film of horse-killing methods by the knife alone, without anæsthetic or even previous stunning, admitted as having been paid for by the R.S.P.C.A., the Report states: "We are satisfied that the slaughterers were paid to kill the horses for the film, and we cannot accept it as any indication of the general practice in Belgium at that time." The Ministry was supplied with copies of affidavits which had been made by the slaughterers to the effect that they were paid to kill the horses for the film; which seems to show rather an anomalous (and one might almost say a disgraceful) thing to have been done by the officials of a Society which professes in its appeals to the public for funds to be animated by humane feelings towards animals.

The Report concludes with fifteen appendices, which show how carefully and thoroughly the individual members of the Committee went into the investigation and examination of the various matters allocated to them. The reading of each appendix is full of interest. The compilation and issuing of this Report are fine pieces of work, and they ought finally to lay to rest the bogey about the inhumanity of the horse traffic and the untrue and unfounded accusations against the veterinary officials of the Ministry of Agriculture and the Shipping Companies.

Personal

CAPTAIN J. Howard Jones, O.B.E., M.R.C.V.S., has been appointed as the Chief Veterinary Inspector for the County of Glamorgan, and the position which he occupied as Chief Veterinary Inspector for the Abattoir under the Public Health Department of the City of Edinburgh is now occupied by Mr. Ernest James Sewell, who has for some time held a junior position in the same Department. The vacancy caused by this latter promotion has been filled by Major Rabagliati, O.B.E., B.Sc., F.R.C.V.S., D.V.S.M., whose good work in the Egyptian Health Service is so well known to the profession.

AMENDE HONORABLE

OWING to a misunderstanding, I published in the September issue of the VETERINARY JOURNAL the advance proof of an article by Dr. F. A. E. Crew on "Rejuvenation of the Aged Fowl through Thyroid Medication" (acknowledging the same fully to the *Journal of the Proceedings of the Royal Society of Edinburgh*), under the impression that it had already been published therein. I find that in this latter respect I was in error, and I gladly accede to the request of the Secretary of the Royal Society of Edinburgh to express my regret.

FREDERICK HOBDAY,
Editor, VETERINARY JOURNAL.

December 1925.

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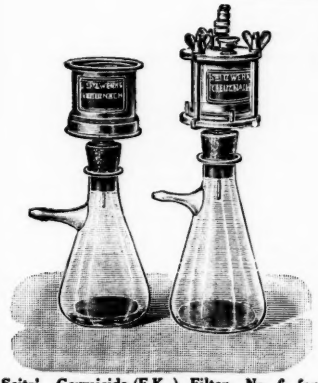

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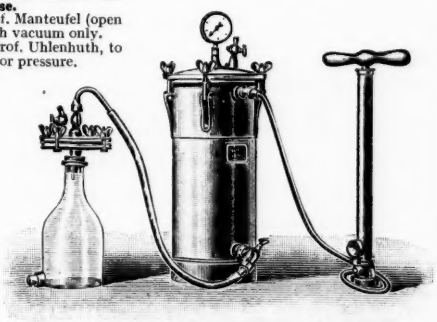

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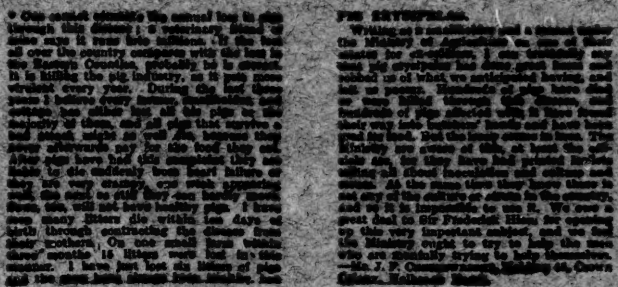

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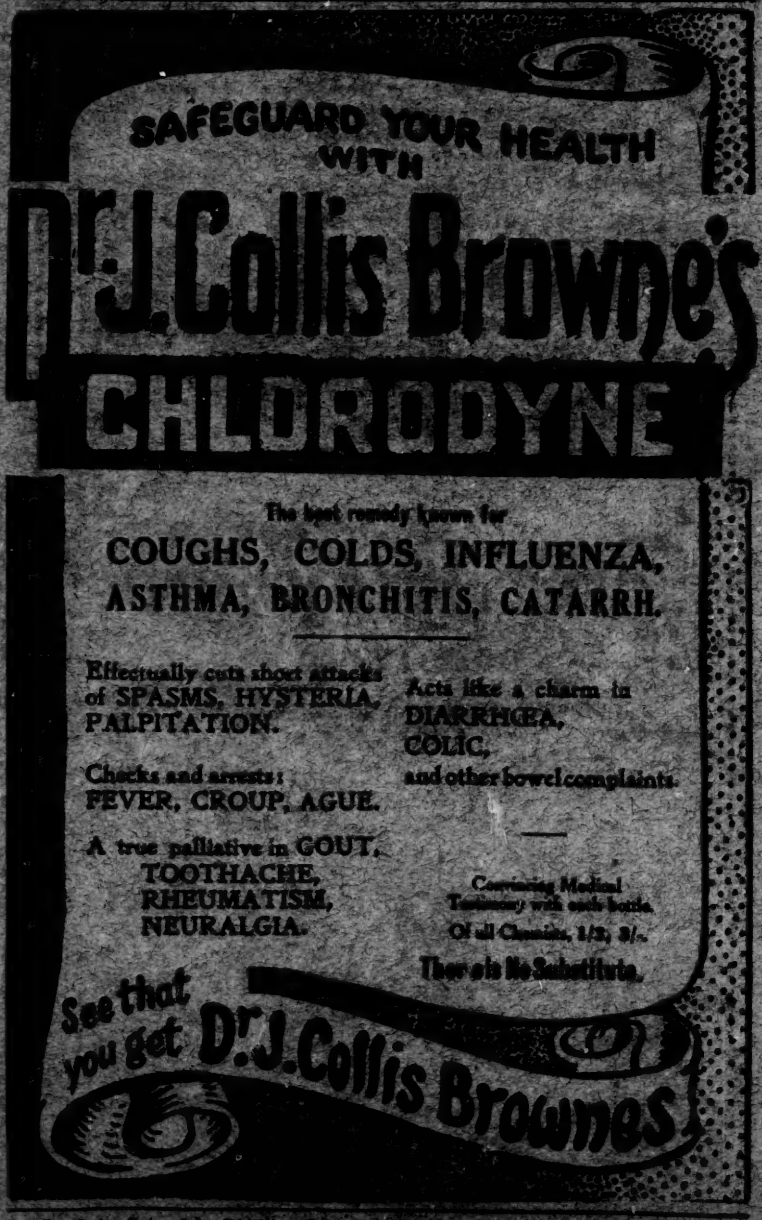
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